

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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January 8, 2007

OK

TO: Internal File

THRU: Wayne Western, Team Co-Lead *WW*  
Steve Fluke, Team Co-Lead *SF*

FROM: Priscilla Burton, Environmental Scientist III, Soils. *PWB by an*

RE: Lila Canyon Extension, Utah American Energy Inc., Horse Canyon Mine,  
C/007/0013, Task ID #2708

### SUMMARY:

Information received on December 1, 2006 is being reviewed under Task #2708. I have also taken the opportunity to update the last soils review (Task 2275, August 2005). I have updated the MTA accordingly.

The Permittee has met the requirements of R645-301-200; approval is recommended.

The Permittee has included a commitment to have a qualified soils specialist on site during topsoil salvage and redistribution (Section 232.100). A Division representative should also be present during cryptogam harvest and soil salvage, since these tasks are paramount to reclamation success.

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**TECHNICAL ANALYSIS:**

**GENERAL CONTENTS**

**REPORTING OF TECHNICAL DATA**

Regulatory Reference: 30 CFR 777.13; R645-301-130.

**Analysis:**

An Order I Soil Survey was conducted of the proposed Lila Canyon extension disturbed area was conducted in August 1998 by Dan Larsen, Soil Scientist, Environmental Industrial Services, Inc., Helper, Utah. The extensive experience and qualifications of Mr. Larsen to perform this survey are detailed in Appendix 1-5.

**Findings:**

The information provided meets the requirements of the Regulations.

**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**SOILS RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

**Analysis:**

The MRP- Part B meets the requirements for soil survey and characterization. UEI discusses soil resources within the Lila Canyon Extension in Chapter 2, Sections 210 through 224 of the MRP- Part B.

Daniel Larsen, a Professional Soil Scientist with Environmental Industrial Services (E.I.S.) conducted an Order I soil survey of the disturbed area in August of 1998. The Soil Survey is found in Section 3.2 of Appendix 2-3. The survey contains soil descriptions, soil pedon descriptions, a soil-salvage suitability analysis, laboratory soil testing data, field soil profile-descriptions, soil and landscape photographs, a soil map, and a salvageable-soils map.

Mr. Larsen performed all mapping and soil survey work according to the standards of the NRCS's National Cooperative Soil Survey.

*Soil Identification and Description, and Productivity*

The predominant soil classification is Strych fine sandy loam. From the soil description sheets in Appendix 2-3 and Plate 2-2, Detailed Soils Map of the Mine Facilities Site, the Division notes that the canyon bench holds deep colluvial soils, stabilized from wind erosion by a surface layer of biological soil crusts, dried plant litter, boulders and live plant cover. The topsoil (A-horizon layer) varies from three to 26 inches deep due to position on the slope. The B-horizon stretches from 31 – 60 inches in the profile and is a zone of carbonate accumulation. Sandstone bedrock underlies the soils, except at the location of the fan portal where shale and burned coal cover the sandstone rock layer. Surface soils are subject to extremes of temperature (Sec 3.2, Appendix 2-3).

The disturbed area vegetation is primarily pinyon-juniper and grass-shrub communities (Plate 3-2). Productivity estimations made in 2003 placed the disturbed area productivity at 350 lbs/acre and the grass/shrub reference area at 450 lbs/ac, low values due to drought (see Appendix 3-2 letter dated 2003).

*Soil Characterization*

Soil pedon descriptions on standard NRCS forms are provided in Appendix D within Appendix 2-3. Soil horizons were sampled and analyzed according to Division guidelines for topsoil and overburden. Table 3.21 in Appendix 2-3 provides generalized soil properties, including percent surface stones and boulders. Soil sampling locations are shown on Plate 2-2, Detailed Soils Map of the Mine Facilities Site. Intermountain Laboratories, Inc analyzed the soil samples. Laboratory data sheets are found in Appendix C of Appendix 2-3.

Appendix 2-3 contains soil macronutrient status information analyzed by BYU Soil and Plant Analysis Laboratory May 1, 2003, providing a reference for comparison with the nutrient content of the redistributed topsoil at final reclamation.

Since the A horizon is less than six inches deep, the topsoil recovered will be a mix of both the A and B horizon soils, in accordance with R645-301-232.200. Depths of salvage range from 6 to 18 inches over the site (see Available Soil Resources table in Section 232.100). A calcic horizon was verified in soil pedons LC1, LC5 and LC6, which will provide a marker for soil salvage depth. The percent rock content within the proposed facilities area is high according to the 1988 Division guidelines, however it is not a deterrent to soil salvage. Large stones, 36 inches or less, are considered part of the soil layer and are included in the topsoil volume estimates.

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**Findings:**

The information provided meets the environmental soils resource information requirements of the R645- Coal Rules.

**ALLUVIAL VALLEY FLOORS**

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

**Analysis:**

**Alluvial Valley Floor Determination**

The information provided in the plan was adequate for the Division to determine that there is no probable existence of an alluvial valley floor.

This section summarizes the land use, soil, plants, geology, surface- and ground water information reviewed by the Division in making the findings required under R645-302-320.

The Lila Canyon Extension is in the western Book Cliffs escarpment. Numerous small seeps and springs exist within and adjacent to the permit area (Section 731.220). Steeply dipping joints transmit ground water from the surface (Section 6.5.3.5) as illustrated in Figure VI-5. The surface expressions of the faulting are grabens and draws. The general strike of the beds in the permit area "B" is N22°W dipping at 11% to greater than 16% towards the East (Figure VI-3 and Plate 7-1-B and Section 6.4.2, Section 6.5.3.3).

Water inflow from the Geneva Tunnels is anticipated (Section 6.6.1). Water inflow associated with fault or fracture systems are possible, but not expected to be significant. The Sunnyside sandstone member of the Blackhawk formation contains the two coal seams of interest: Upper Sunnyside and Lower Sunnyside Seams. The sandstone beneath the Lower Sunnyside coal seam is considered to be a zone of groundwater accumulation (Section 6.4.1). Historical records for the Geneva Mine (now known as the Horse Canyon Mine) indicate that the mine was dry until the Sunnyside Fault was intercepted. This suggests that as mining progresses down dip, "substantial" water may be encountered, but this water will be isolated from the surface recharge zone (Section 6.6.3.1) and indications are that the Sunnyside Fault will not be encountered within the Lila Canyon Extension (Section 6.5.3.3).

The Mancos Shale forms the slopes below the base of the Book Cliffs, overlain in places by pediment deposits (Section 6.4.1 and Plate 6-1). In the permit area, drainages flow in response to snow melt and precipitation events (Section 731.220 and Plate 7-1). Coleman Wash receives the Lila Canyon drainage. Grassy Wash and Marsh Flat Wash collect the flow from the

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Mancos slopes further south. Little Park Wash channels the flow on the plateau above. There is no valley holding a perennial stream in the permit area (Section 724.700).

Order III soil survey (Plate 2-1) indicates that the soils on the plateau in Little Park Wash are Neto Fine Sandy Loam (Section 220.200). This soil is comparable to the Glenberg soil described in the published Carbon County Soil Survey, according to Leland Sasser, Soil Scientist and Survey Project Leader with the NRCS, Price Field Office, Utah (consultation June 5, 2001). Plate 3-2, Vegetation indicates that the dominant species growing on the plateau in the vicinity of Little Park Wash are Atriplex, Artemesia and Elymus, none of which are wetland species.

Little Park Wash falls within the Little Park grazing allotment (Plate 4-2). The land use is unimproved rangeland and wildlife habitat. There is no farming activity upstream or downstream of the permit area, therefore, the proposed operations will not interrupt, discontinue, or preclude farming on an alluvial valley floor. Based on the information provided in the plan, in accordance with R645-302-321.100, the Division determines that there is no probable existence of an alluvial valley floor.

### Findings:

Based on the information provided in the plan, in accordance with R645-302-321.100, the Division determines that there is no probable existence of an alluvial valley floor.

## PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

### Analysis:

The Natural Resources Conservation Service (NRCS) determined in 1998 that there are no Prime Farmlands at the proposed disturbed site (see Appendix 2-1).

### Findings:

The Division concurs with the NRCS determination made in 1998 that there are no Prime Farmlands at the proposed disturbed site.

## GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

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**Analysis:**

Section 731.111 and Section 731.121 discuss the results of sampling conducted 23 years ago in the general area (holes S2 and S24). The analyses of these drill holes are found in Appendix 6-2. EPA Toxicity methods were used to analyze the rock for Nickel, Manganese, Iron, Boron and Selenium and acidity. This information applies to the rock tunnels in a very general way. More testing is planned for the rock tunnels as described in Appendix 5-7 of the application.

**Findings:**

The information provided, along with the commitment to test the rock slope material as it is excavated, meets the requirements for geologic testing.

## **OPERATION PLAN**

### **AIR POLLUTION CONTROL PLAN**

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

**Analysis:**

First year production from the mine is estimated to be 200,000 tons, increasing in the second through fifth year to between 1,000,000 and 1,500,000 tons. Long wall mining could be utilized to generate as much as 4,500,000 tons a year (Section 523).

Appendix 4-3 contains correspondence between UEI and the Department of Environmental Quality, Division of Air Quality (DAQ). In the cover letter for the Notice of Intent dated December 22, 1998, UEI requested approval for a Minor Source of up to 2,000,000 tons/year. An Approval Order (DAQE-702-99) was issued August 27, 1999.

The Approval Order (AO) indicates public comments were considered in developing the requirements of the AO for this new source. The DAQ received five public comments on degradation of the environment in general and one comment referring to air quality degradation in particular.

The AO is predicated on UEI operating according to the Notice of Intent submitted to the DAQ on December 24, 1998, and additional information submitted to the DAQ on February 19, 1999 and May 11, 1999.

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The following equipment was approved with the AO:

- One enclosed crusher rated at 500 tons/hr equipped with dust suppression spray at its exhaust.
- One truck loading facility with enclosed 450 tons surge bin and sprays as needed.
- One (80 ft tall) stacking tube with associated coal stockpile (27,000 Tons of open storage, Section 520 of the MRP-MRP - PART B).
- One reclaim system conveyor.
- Associated conveyors equipped with dust suppression sprays at all transfer points.
- Mobile diesel equipment.
- 0.68 miles of paved road, posted speed limit 25 mph, as per General Condition #13.

The requirements of the AO include:

- Annual training of employees;
- Control of disturbed or stripped areas through treatment;
- Maintenance of 4.0% moisture content of fines;
- Watering storage piles, as conditions warrant;
- Limitations on the silt-size coal fines in stored coal (5.1%) and haul roads (10%);
- Visible emissions limits (20% opacity);
- Maintaining the surface of unpaved roads and pad areas in a damp/moist condition;
- A production limit of 1,500,000 tons of coal per rolling 12 month period;
- A consumption limit of 63,000 gallons of diesel fuel per rolling 12 month period;
- Use of #2 fuel oil only; and
- Sulfur content of fuel oil or diesel is not to exceed 0.5% by weight

The AO from the DAQ ensures that particulates and pollutants will be controlled through very specific dust suppression requirements, pollution control equipment, limited fuel consumption and proper equipment maintenance, limited production, employee training and record keeping. In accordance with the approved Air Quality Order DAQE-702-99 General Condition # 13, Section 520 (p. 18) of the MRP-Part B indicates that the haul road will be paved during construction of the facilities. Section 520, pg 19, indicates that all unpaved roads and pad areas used by mobile equipment will be treated with water or dust suppressant and that open stockpiles will be watered as conditions warrant.

UEI has informed the DAQ of the delay in construction of the Lila Canyon site in a letter dated June 10, 2000, as required by AO DAQE-702-99 General Condition #6 (E-mail communication between Maung Maung and Priscilla Burton on June 3, 2004).

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A rain gauge will be installed at the site to comply with the Air Quality Approval Order (Section 724.411).

**Findings:**

The Division finds that UEI has obtained the required DAQ permit. The information provided meets the requirements for air pollution control plans.

**TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

**Analysis:**

The disturbed area boundary will encompass 42.6 acres\*\* (Section 116.100, Section 542.200, Appendix 5-8), as outlined on Plate 5-2. This entire disturbed area will be bonded (Section 521.163). However, topsoil will be removed from only 25.30 acres (Available Soil Resources Table Section 232.100) to develop the surface facilities described in Section 542.200. Consequently, Plate 5-2 illustrates islands of "undisturbed" within the "disturbed" area.

Section 116.100 of the MRP - PART B describes islands of undisturbed land within the disturbed area. [42.6 acres within disturbed area boundary – 25.3 acres of topsoil salvage = 17.3 undisturbed acres in islands, by Division calculations.] These islands will be marked with signs (Section 231.100) and protected by a 20 ft buffer zone (Section 234.220). The undisturbed islands will be protected with rock barriers and incidental rock distribution (Plate 5-2).

UEI will install an enclosed conveyor (Section 232.710) in an attempt to keep the native soils (beneath the conveyor and in undisturbed islands) free of coal accumulations. Installation of jersey barriers will protect the slope from encroachment by the coal stockpile. UEI will monitor the undisturbed soils quarterly for coal fine deposition (Section 234.220 MRP – Part B, see also discussion under Support Facilities in this TA). Should monitoring indicate the need, additional measures (such as implementing water sprays or construction of a wind fence) will be taken to protect these lands from incidental coal fine deposition (Section 234.220).

For the purposes of removal, Section 231.100 of the MRP- PART B defines topsoil as all soil from the surface down to eighteen inches. Plate 2-3 Soil Salvage and Replacement provides guidance for the topsoil removal, illustrating removal of eighteen inches of topsoil from the central and northwest portion of the disturbed area; twelve to eight inches being removed from the roadway; twelve to eighteen inches removed from the sediment pond location; and eight to eighteen inches removed from beneath the coal stockpile and coal storage bin.

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Soils will be removed from all disturbed areas including stony areas to a depth of eighteen inches or to shale (Sections 232.100 and 232.300) with the following exceptions:

- The steep rocky slopes within the disturbed area below and between the conveyor and coal storage pile (Section 232.710).
- The two bents to be constructed for the conveyor (Section 232.710).
- The area of topsoil storage (topsoil will be removed from the access road to and around the topsoil pile, but not from beneath the topsoil pile, Section 232.100).
- The slope between the coal pile road and the portal access road (Plates 2-3 and 5-2). [No disturbance is anticipated for this slope, consequently, Section 520, Support Facilities List item #37, indicates that UEI will evaluate the condition of the slope after road construction and label the slope either disturbed or undisturbed, as appropriate, on an As Built site map.]

Soils to be salvaged are estimated to be 50,236 bank CY or 59,278 loose CY (Table of Available Soil Resources in Section 232.100). The table divides salvageable soil by map unit type. Soils will be removed from the 25.3 acres to be disturbed with a crawler-tractor, grader, front-end loader, and/or trackhoe.

To protect the soil resource, UEI has committed to handling the soils at an optimum moisture content, when the soils are loose and friable (Section 231.100), adding moisture or allowing the soils to dry as needed.

UEI commits in Sections 231.100 and 232.100 to employ a qualified soils specialist to oversee the soil salvage, construction of subsoil storage site, and reclamation of the site. UEI further commits in Section 232.500 to maintain records of materials removed and placement of materials either in the topsoil storage pile or in the fill. Soil pedestals will be left to verify soil removal depths (Section 232.500). Further, the MRP-Part B provides a commitment to develop As-Built maps showing where subsoil materials have been used as fill material (Section 232.500), including thickness of topsoil, subsoil, and substrata.

The Division received comments on the need for soil-borrow areas. Topsoil will be recovered from all disturbed areas (from a minimum depth of 6 inches from RBT soil up to 18 inches from VBJ, SBG and DSH soils). The total recovery of topsoil is estimated at 50,236 bank cubic yards. On the average, this represents a replacement depth of 15 inches over the proposed 25 disturbed acres. Furthermore, the Order 1 Soil Survey that suggests subsoils are also suitable for plant growth down to a depth of 48 inches (Appendix 2-3). These subsoils will be placed where they can be recovered and utilized to increase the rooting depth at reclamation. There is no need to develop a soil borrow area.

Storage of the approximately 59,000 loose cubic yards of topsoil will be in a stockpile (Section 232.100 Available Soil Resources Table) with the approximate dimensions 26 ft high X

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246 ft long X 146 ft wide (Section 232.100), with 2h:1v side slopes. Plate 5-2 and Plate 2-4 show the location of the topsoil stockpile, as well as the cross-section 4+00 on Plate 5-7A-2. The plan must include a commitment to survey the topsoil stockpile and provide an as-built dimensions and volumes.

The topsoil stockpile is located on Plate 5-2 and Plate 5-7, among others. Topsoil stockpile will be an Alternate Sediment Control Area (ASCA) protected from upstream flow by drainage ditches (design shown in Appendix 7-4). The stockpile will be loosely piled with a rough, irregular, pitted surface retain moisture and reduce erosion (Sections 231.100 and 231.400). The Division notes that this practice is described in the Practical Guide to Reclamation (DOGM, 2000), available at <http://dogm.nr.state.ut.us>.

The topsoil will be retained in place with the use of berm/ditches or silt fences surrounding the pile. The stockpile will be mulched and seeded in the fall (after September 15 and before January 15) using the mix in Table 3-4 (Section 231.400). Table 3-4 is a mix of native grasses, forbs and shrubs. Species in the mix should control erosion yet maintain the natural beauty of the landscape. Section 231.100 and Section 231.400 indicate that if seeding does not immediately follow topsoil pile construction, the pile will be roughened again immediately prior to seeding.

The surface layer of soil is valuable, for it contains seeds, cryptogam filaments, other microorganisms, organic matter, elevated levels of nitrogen and phosphorus. UEI has committed to gathering eight, five gallon buckets of cryptogamic soil separately from the remainder of the topsoil salvage (Section 232.100). UEI proposes to try to establish cryptogams on the topsoil stockpile by using the cryptogamic soil as an additive to each load of wood fiber mulch hydrosprayed on the surface of the gouged topsoil pile. The cryptogamic soil will be mixed with wood fiber mulch at a rate of 1% by volume (Section 234.230).\*\* The biologic soil crusts established on the topsoil pile will be later harvested for inoculation of the reclaimed site.

The Division previously recommended that the topsoil pile receive an initial irrigation after the cryptogam/mulch is sprayed onto the topsoil surface, to ensure good contact and growth of the cryptogams. This recommendation was based upon Jayne Belnap's work, "Cryptobiotic Soil Crusts: Basis for Arid Land Restoration (Utah)," Restoration and Management Notes 12:1 Summer 1994. UEI has declined to irrigate. Since the research on this issue is limited, the Division will not press the issue, unless further evidence of the benefits of irrigation in establishing transplanted cryptogam filaments becomes known.

Storage of topsoil from the topsoil storage area access road will be in berms around the topsoil stockpile (Section 232.100). Storage of topsoil from the fan portal will be in a berm around the fan disturbance (Section 234.100). Plate 5-2 shows the location of the topsoil berm at the fan site. To avoid contamination with rock dust, the berm will not extend in front of the fan. The bermed fan portal soil will be protected with a silt fence and vegetated (Section 234.100).

**\*\* Note:** The percentage of cryptogamic soil to be added to the hydromulch should probably be on the order of 1% by volume. The area of the proposed topsoil stockpile is 246 ft X 146 ft with 2:1 side slopes or about one acre. Approximately 4,000 gallons of hydromulch spray are required for one acre, therefore eight, 5 gallon buckets of screened cryptogamic soil (through a ¼ inch sieve) will be added to the tank to create a 1% concentration (conversation between Priscilla Burton and Bill Lee, Skyline Reclamation, on May 27, 2004).

### *Subsoils*

The recommendation for soil salvage of between six and 48 inches of topsoil and subsoil from the disturbed area is based upon the Order 1 Soil Survey (Appendix 2-3 and Section 232.500).

Section 232.500 of the MRP- PART B states that subsoil from 12 – 30 inches from cut areas will be used as fill material during operations, about 18,000 yd<sup>3</sup> (total subsoil cut is provided in the legend of Plate 2-3 by soil type). The total cut volume is estimated at 44,283 yd<sup>3</sup> (Table 1, App. 5-4). Subsoil will also be used as cover over the waste rock disposed of in the refuse area (pages 2-3, Appendix 5-7). Section 232.700 specifies the subsoil recovery for soil types SBG, DSH, and VBJ, based upon recommendations found in Part 3.4 of Appendix 2-3 Soil Inventory. The Division understands that the recovery depth in inches is the depth of salvageable subsoil remaining after topsoil removal. Thus, for SBG soil the 30-inch removal thickness would come from between 18 inches and 48 inches in the profile.

The Division received comments that a subsoil stockpile should be required. An average recovery depth of 15 inches from the site will provide an adequate supply of topsoil for final reclamation. In addition the location of subsoil with suitable reclamation characteristics will be mapped for ease of recovery and replacement during reclamation (Section 232.500, Section 241, Section 242.100). These subsoils will be used as fill underneath parking areas, roads, buildings, and storage sites. These subsoils will be protected during operations by asphalt, concrete, or gravel over an impervious membrane (Section 232.500). Section 232.500 further B indicates that upon reclamation, subsoils found to be contaminated with oil, grease, or salts through visual evaluation will be hauled to a landfill site.

**\*\*[NOTE:** The Available Soil Resources Table (Section 232.100) indicates that there are potentially 48.23 acres of surface disturbance. This table was taken from the soil survey and does not accurately reflect UEI's intention to include 42.6 acres of disturbance within the disturbed area boundary.]

### **Findings:**

The information provided meets the requirements of the Regulations.

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## SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

### Analysis:

#### Disposal Of Noncoal Mine Wastes

The PAP indicates in Section 542.640 that a minimum of two feet of cover will be placed over sand and gravel road surfacing materials and asphalt will be disposed off-site. Concrete will be buried by four feet of cover (Section 542.741) in the location shown on Plate 5-6.

#### Refuse Piles

The Permittee shows the location of the refuse pile on Plate 5-2. Section 520 (Refuse Piles) states the refuse- pile capacity as 44,400 CY. In Appendix 5-7, the Permittee explains that 25,000 cubic yards of excavated rock from the tunnel development will be used as structural fill in a portion of the refuse site and that the remainder of the refuse site could hold 19,473 cubic yards of coal processing waste.

Figures 1 and 2 of Appendix 5-7 show the refuse pile in plan view and cross section. The Permittee will salvage the top 18 inches of undisturbed ground as topsoil, then remove the subsoil from 12 – 30 inches (Section 232.500). **The Division understands that the recovery depth in inches is the depth of salvageable subsoil remaining after topsoil removal. Thus, for SBG soil the 30-inch removal thickness would come from between 18 inches and 48 inches in the profile.**

Upon reclamation, the Permittee shows that they will cover the coal mine waste with 18 inches of topsoil and 30 inches of fill material, totaling 48 inches of cover, complying with the requirements of R645-301-553.252 (Figure 2, Appendix 5-7). The Permittee will treat and dispose of all coal mine waste as if the material were acid- or toxic-forming. All coal mine waste will be disposed of under four feet of material.

The Permittee outlines the testing of coal mine waste in Appendix 5-7. The Permittee will test all rock slope material five times. The Permittee will only use rock slope material as structural fill. The testing will take place during the initial start up, at the ¼ mark, the ½ mark, and the ¾ mark and near completion. The Permittee will test other coal mine waste, generated during operations from the crusher and underground development, containing coal every 6,000 cubic yards.

**Findings:**

The information provided meets the cover requirements for coal mine waste.

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Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

**Analysis:**

**Acid- and Toxic-Forming Materials and Underground Development Waste**

The Permittee has committed to periodic sampling of the materials to be placed in the refuse pile; samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation: parameters to be analyzed are in Table 2 of Appendix 5-7.

The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to build the pads will be left in place and buried under 4 feet of subsoil and topsoil as well (Chapters 2, 5, and 7, and Appendix 5-7).

**Findings:**

The information provided meets the requirements of the Regulations.

**SUPPORT FACILITIES AND UTILITY INSTALLATIONS**

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

**Analysis:**

The disturbed area boundary for permit area "B" encompasses 42.6 acres, however there will be only 25.3 acres actually disturbed for the operations area. This leaves 17.3 acres of undisturbed ground within the disturbed area boundary. Leaving as much land undisturbed as possible fulfills the requirements of R645-301-333, "...the operator will minimize disturbances and adverse impacts," if the 17.3 acres of land within the disturbed area boundary is protected from disturbance.

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Plate 5-2 shows the facilities to be developed at the site. The Plate shows a Run of Mine (ROM) storage pile containing approximately 27,000 Tons of open storage at the upper end of the permit area, within 20 ft of undisturbed slopes. The Lila Canyon ROM stockpile will be somewhat protected from winds by the escarpment to the east and north. The Permittee has included in Section 520 of the MRP several means by which deposition of coal fines on the undisturbed slope will be controlled:

- enclosed conveyor from the portal to the ROM storage pile.
- 80 ft distribution tube to control the drop of ROM coal.
- jersey barriers to prevent encroachment against the canyon slope.
- ROM stockpile will be 8 inch minus.
- water sprays at the head roller to moisten the coal as it falls into the pile.
- in-line crusher with covered conveyor from ROM to loadout bin.
- water sprays at all transfer points.

In addition, the deposition of coal fines onto undisturbed ground from the ROM storage pile will be visually monitored quarterly (Section 234.220 MRP – Part B). If monitoring reveals coal fine deposition, then water sprays on the open stockpile will be warranted as per the August 27, 1999 Approval Order (DAQE-702-99) General Condition #16. In addition, the Permittee could broaden the area of topsoil salvage within the disturbed area or employ additional measures, such as a wind fence. [A silo was considered, but three concrete structures would be required to handle 27,000 Tons of ROM and that's a lot of concrete to be buried on site during reclamation.]

**Findings:**

The information provided meets the requirements of the Regulations.

## **RECLAMATION PLAN**

### **POSTMINING LAND USES**

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

**Analysis:**

The postmining land use is in accordance with the BLM's management plans. Appendix 4-2 contains a letter from the BLM stating the postmining land use for the area is wildlife habitat,

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grazing, and incidental recreation. Should these plans change, the Permittee will accommodate the landowner (BLM) and Emery County at the time of reclamation (Section 412.140).

The reclamation plan is presented in Appendix 5-8 and Chapters 2, 3, and 5 of the PAP. The site will be monitored for 10 years prior to final bond release. Should monitoring indicate that livestock grazing is detrimental to the achievement of bond release, fencing the site will be considered along with supplemental seeding. There will be no roads left in the disturbed area.

SUWA previously commented that the PAP fails to restore the land to a quality capable of supporting wilderness designation. In the 2003 settlement with the State of Utah, the Secretary of Interior agreed that public lands other than Section 603 WSA's and Congressionally designated wilderness could not be managed or otherwise treated as wilderness study areas, absent congressional authorization.

SUWA previously commented that the restoration plan is inadequate to ensure that the water sources and other wildlife habitats will be returned to the postmining land use. These issues are addressed in the reclamation section of this TA.

### **Findings:**

Information provided in the application meets the minimum Postmining Land Uses requirement of the regulations.

## **TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

### **Analysis:**

#### **Redistribution**

The MRP describes in Section 241 grading the surface to Approximate Original Contour (AOC), replacement of subsoils in the root zone, ripping, replacement of topsoil, replacement of boulders and gouging and treatment of the surface with an inoculum.

The Permittee has provided Plate 2-3 outlining Soil Salvage and Replacement. In addition, the grading sequence is itemized in steps a through f. The sequence begins with: "a. Grade all areas where no subsoil is being stored. b. Replace subsoil on areas from which it was removed." Comments were previously made that the sequence as written was very confusing. Crucial to the understanding of steps a and b in the regrading sequence will be the As-Built map (Section 232.500) that will provide the operational location of the subsoils suitable

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for placement in the top four feet rooting zone. i.e. subsoil from soil map units SBJ, DSH and VBJ is identified in the Order 1 Soils Survey. The As-Built map is referred to in the discussion of Section 241 and 242.100 and 232.500. The Division understands and follows the concept of salvaging the subsoil and documenting its placement for use at final reclamation.

Comments were previously made on the depth of topsoil replacement, with interested parties believing that the MRP called for eighteen inches of topsoil to be replaced over the entire site. Section 242.100 describes the replacement of topsoil to approximate the variable depth of topsoil encountered at the site during the Order 1 Soil Survey (see Plate 2-3 Topsoil salvage and Replacement). Section 242.100 also outlines the equipment to be used to replace the topsoil.

Re-establishment of biologic soil crusts will be attempted on the surface of the topsoil storage pile (Section 231.400). If successful, this source of biologic soil crusts will be utilized to inoculate the reclaimed site (Section 244.200). At the time of reclamation more options for cryptogam re-establishment may be available. For example, the U.S. Army Corps of engineers is experimenting with cyanobacteria pellets, which may be commercially available (see <http://www.cecer.army.mil/td/tips/product/details.cfm?ID=527> ).

An inoculum will be applied to the reclaimed soil surface to re-establish bacteria, mycorrhiza and mycelium in the soil. The MRP is not clear on what product will be re-applied to the soil to re-establish bacteria, mycorrhiza, and mycelium (Section 241), however the Division expects that the best technology available at the time of reclamation will be employed, as per R645-301-333.

Amendments will replace lost soil nutrients based upon testing of the topsoil stockpile prior to redistribution (Section 243). Four or five Grab samples will be collected to a depth of 18 inches from the stockpile the topsoil pile height is reduced to approximately 10 feet at its deepest end. These samples will be analyzed for nitrogen, potassium, and phosphorus (Section 243) The This method enables measurement of the bottom and middle portions of the stockpile rather than the surface.

Appendix 5-8 indicates fertilizer application to the reclaimed surface will be based upon the testing of the topsoil. In past reclamation, the Division has noted that the application of nitrogen was a detriment to the encouragement of native species. The application of fertilizer may be detrimental to the establishment of micro-organisms as well. Plant nutrients should be applied only in the case of severe deficiencies.

### **Findings:**

The information provided in the application is adequate for the purposes of the Regulations.

## STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

### **Analysis:**

For this site, the Order 1 Soil Survey identifies microbial crusts on the surface of the soil. Microbial crusts stabilize the soil through protection of the soil from water and wind erosion.

The plan recognizes the need to re-introduce microbial life in Section 241, and specifies a method in Section 244.200. Section 244.200 indicates that if soil crusts form on the topsoil pile, they will be added to the wood fiber mulch application in an attempt to reestablish biologic soil crusts on the reclaimed soil surface.

The best technology for re-introducing cryptogams on a large scale is still a subject of research. The internet site [www.soilcrust.org](http://www.soilcrust.org) provides excellent references. Introduction of biologic soil crusts may be as simple as sprinkling the crushed organisms over the surface and irrigating as described by Jayne Belknap in the publication, "Cryptobiotic Soil Crusts: Basis for Arid Land Restoration (Utah)," Restoration and Management Notes 12:1 Summer 1994. The Permittee's commitment to advancing this research is commendable.

Appendix 5-8 Reclamation and Enhancement Plan describes the means of soil stabilization including: gouging of the site to encourage a roughened appearance as shown in Figure 1; and placement of large rocks and boulders and vegetation; application of 500 lbs/acre wood fiber mulch and 100 lbs/acre of tackifier with seeding and then a second over spray of 1500 – 2000 lbs/acre of wood fiber mulch with 100lb/ac of tackifier and 200 lb/ac of 16-16-8 fertilizer, if required by testing described in Sec 234. Appendix 5-8 further describes the use of wood fiber mulch over topsoil.

In accordance with R645-301-244.300, rills and gullies that contribute to a violation of water quality or that disrupt the post-mining land use will be filled, regraded or stabilized.

### **Findings:**

The information in the PAP meets the requirements of the Regulations with regard to stabilization of the soil surface and control of erosion and air pollution attendant to erosion.

### **RECOMMENDATIONS:**

Approval is recommended.